

CLAIM STATUS

1. (Canceled)

2. (Currently Amended) The method of claim [[1]] 14, wherein collecting the workpiece state trace data further comprises collecting metrology data associated with the workpiece.

3. (Original) The method of claim 2, wherein the workpiece comprises a semiconductor device, and collecting the metrology data further comprises measuring at least one of a transistor gate critical dimension, a process layer thickness, a particle contamination count, and a transistor active region dimension.

4. (Original) The method of claim 2, wherein the workpiece comprises a semiconductor device, and collecting the metrology data further comprises measuring at least one of a transistor effective channel length, a drive current, an insulating layer dielectric constant, a transistor overlap capacitance, a regional material resistivity, a transistor threshold voltage, an n-channel to p-channel drive current ratio, an off-state transistor leakage current, and electrical charge carrier mobility measurement, and an oscillator test circuit frequency.

5. (Currently Amended) The method of claim [[1]] 14, wherein collecting the workpiece state trace data further comprises collecting defect data associated with the workpiece.

6. (Original) The method of claim 5, wherein the workpiece comprises a semiconductor device, and collecting the defect data further comprises identifying at least one of a missing

pattern defect, an extra pattern defect, a particle contamination defect, and an electrical arc damage defect.

7. (Currently Amended) The method of claim ~~[[1]]~~ 14, wherein collecting the workpiece state trace data further comprises collecting process data associated with the processing of the workpiece in the process flow.

8. (Original) The method of claim 7, wherein the workpiece comprises a semiconductor device, and collecting the process data further comprises measuring at least one of an implant dose and energy, and an anneal temperature and time.

9. (Currently Amended) The method of claim ~~[[1]]~~ 14, wherein generating the quality profile further comprises generating at least one quality characteristic metric associated with the workpiece.

10. (Original) The method of claim 9, wherein generating the quality characteristic metric further comprises generating at least one of a yield characteristic metric, a grade characteristic metric, a power consumption characteristic metric, a film resistivity metric, a film capacitance metric, a defect density metric, and a feature dimension metric.

11. (Original) The method of claim 9, wherein generating the quality characteristic metric further comprises determining the quality characteristic based on the collected workpiece state trace data and an equation based model.

12. (Original) The method of claim 9, wherein generating the quality characteristic metric further comprises determining the quality characteristic based on the collected workpiece state trace data and an empirical model.

13. (Original) The method of claim 12, wherein generating the quality characteristic metric further comprises:

comparing the collected workpiece state trace data to a library of reference workpiece state traces, each reference workpiece state trace having an associated quality characteristic metric;

selecting a reference workpiece state trace closest to the collected workpiece state trace data; and

selecting the quality characteristic metric associated with the selected reference workpiece state trace.

14. (Currently Amended) A method, comprising: The method of claim 1, further comprising

processing a workpiece in a process flow;

collecting workpiece state trace data for the workpiece during its processing in the process flow;

generating a quality profile of the workpiece based on the workpiece state trace data; and

periodically updating the workpiece state trace data and updating the associated quality profile as the workpiece progresses through the process flow.

15. (Currently Amended) The method of claim ~~[[1]]~~ 14, wherein processing the workpiece further comprises processing a semiconductor device.

16. (Original) The method of claim 15, wherein processing the semiconductor device further comprises processing at least one of a microprocessor, a memory device, a digital signal processor, and an application specific integrated circuit.

17. (Canceled)

18. (Currently Amended) The system of claim ~~[[17]]~~ 30, wherein the workpiece state trace data further comprises metrology data associated with the workpiece.

19. (Original) The system of claim 18, wherein the workpiece comprises a semiconductor device, and the metrology data further comprises at least one of a transistor gate critical dimension, a process layer thickness, a particle contamination count, and a transistor active region dimension.

20. (Original) The system of claim 18, wherein the workpiece comprises a semiconductor device, and the metrology data further comprises at least one of a transistor effective channel length, a drive current, an insulating layer dielectric constant, a transistor overlap capacitance, a regional material resistivity, a transistor threshold voltage, an n-channel to p-channel drive

current ratio, an off-state transistor leakage current, and electrical charge carrier mobility measurement, and an oscillator test circuit frequency.

21. (Currently Amended) The system of claim ~~[[17]]~~ 30, wherein the workpiece state trace data further comprises defect data associated with the workpiece.

22. (Original) The system of claim 21, wherein the workpiece comprises a semiconductor device, and the defect data further comprises at least one of a missing pattern defect, an extra pattern defect, a particle contamination defect, and an electrical arc damage defect.

23. (Currently Amended) The system of claim ~~[[17]]~~ 30, wherein the workpiece state trace data further comprises process data associated with the processing of the workpiece in the process flow.

24. (Original) The system of claim 23, wherein the workpiece comprises a semiconductor device, and the process data further comprises at least one of an implant dose and energy, and an anneal temperature and time.

25. (Currently Amended) The system of claim ~~[[17]]~~ 30, wherein the quality profile further comprises at least one quality characteristic metric associated with the workpiece.

26. (Original) The system of claim 25, wherein the quality characteristic metric further comprises at least one of a yield characteristic metric, a grade characteristic metric, a power

consumption characteristic metric, a film resistivity metric, a film capacitance metric, a defect density metric, and a feature dimension metric.

27. (Original) The system of claim 25, wherein the quality monitor is further configured to determine the quality characteristic based on the collected workpiece state trace data and an equation based model.

28. (Original) The system of claim 25, wherein the quality monitor is further configured to determine the quality characteristic based on the collected workpiece state trace data and an empirical model.

29. (Original) The system of claim 28, wherein the quality monitor is further configured to compare the collected workpiece state trace data to a library of reference workpiece state traces, each reference workpiece state trace having an associated quality characteristic metric, select a reference workpiece state trace closest to the collected workpiece state trace data, and select the quality characteristic metric associated with the selected reference workpiece state trace.

30. (Currently Amended) A manufacturing system, comprising: The system of claim 27,
the quality monitor is further configured to

a plurality of tools configured to process a workpiece in a process flow; and

a quality monitor configured to collect workpiece state trace data for the workpiece

during its processing in the process flow, generate a quality profile of the

workpiece based on the workpiece state trace data, and periodically update the
workpiece state trace data and update the associated quality profile as the
workpiece progresses through the process flow.

31. (Currently Amended) The system of claim [[2/]] 30, wherein the workpiece further comprises a semiconductor device.

32. (Original) The system of claim 31, wherein the semiconductor device further comprises at least one of a microprocessor, a memory device, a digital signal processor, and an application specific integrated circuit.

33. (Currently Amended) A manufacturing system, comprising:

means for processing a workpiece in a process flow;

means for collecting workpiece state trace data for the workpiece during its processing in
the process flow; [[and]]

means for generating a quality profile of the workpiece based on the workpiece state trace
data; and

means for periodically updating the workpiece state trace data and update the associated
quality profile as the workpiece progresses through the process flow.